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PcCR 1417ACL4 System

Automatic Cassette Loading Version

User Manual

To be used with OREX Scanner Interface Version 2.5.1.0.9

OREX Computed Radiography Ltd.

OREX Ltd. is a market innovator in the field of portable Computed Radiography Technologies—designed and priced for low-volume clinic or field unit needs.

Founded in 1995 under the name of Digident, the company initially entered the market of desktop dental radiography providing high quality, portable CR reading units for dental and orthodontic professionals around the world. The secret of Digident/OREX's rapid success lies in *the best cost-performance ratio on the market*.

OREX designs, manufactures and markets phosphor image laser scanners. These units replace the traditional x-ray film and light box. The scanners allow the user to immediately read the x-ray image from the phosphor plate, and transfer it to a DICOM 3 compatible digital computer file. Once transferred, users can manipulate the digital image for close-up screening, or transmit it for long-distance consultation. After each scan, the phosphor plates are automatically erased by the unit, ready for re-use.

OREX provides clients with a full solution including phosphor image plates, laser readers, software for image processing, storage, retrieval and communication in Picture Archiving and Communications System (PACS) compatible format.

The company's mission is to become a leading provider of compact personal CR systems. Following the successful penetration of the global dental market, the company changed its name from Digident to OREX and expanded its markets and product lines to serve the *dental, medical, military, industrial and veterinary* fields.

"We are committed to assisting our customers in obtaining maximum value from OREX products by providing excellent support at exceptional value."

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List of Abbreviations

FAQ – Frequently Asked Questions

LED – Light Emitting Diode

USB – Universal Serial Bus

GUI – Graphic User Interface

Preface

This manual provides all the required information for scanning a medical plate using the OREX PcCR 1417 reader. The manual is intended to be used by medical personnel, and is comprised of the following sections:

Section 1: PcCR 1417 System Introduction
This section includes the PcCR 1417 System operation principles, mechanical description, technical information, features, and instructions on how to clean plates.

Section 2: Using the PcCR 1417 System
This section provides a general flowchart and step-by-step instructions on how to scan and erase a plate using the PcCR 1417 System, and instructions on how to change the photo multiplier gain (PM gain) value of a poor or overexposed image.

Section 3: X-ray Machine-to-Scanner Calibration
This section provides step-by-step instructions on how to calibrate the scanner to the local x-ray machine.

Section 4 Image Property
This section provides instructions for selecting an image format and location.

Section 5 Resolution, Orientation and Linearization
This section provides instructions for selecting a scanning resolution and an image orientation, and for using the Linearization algorithm.

Section 6 Erasing Options and Automatic Scan
This section provides instructions for controlling the film erasing time and working with the automatic scan/erase mode.

Section 7 RAIS 2
This sections describes the dual scan feature, mostly used for on-the-spot study display.

Section 8 About OREX Software
This section depicts the layers of the system's software, and the number of scans performed since last reset.

Section 9 Troubleshooting
This section provides general guidelines for correcting malfunctions that may occur while using the PcCR 1417 System, and answers to Frequently Asked Questions (FAQs).

Section 10 Recording Sub-Organs Offset and PM Gain Values
This section provides a place for you to record the PM gain values you set for various organs/sub-organs.

Section 11 Cleaning the Rollers
This section explains how to clean the rollers of the scanner with the cleaning plate.

Section 12 Demo Scan
This section explains how to display a demonstration image on your computer screen without connecting to the scanner.

Section 13 Installing Context Vision
This section walks you through installing the Context Vision filter.

Safety Summary

LIFTING HAZARD

The PcCR 1417 scanner weighs 40 Kg (88 lb). Do not try to lift the scanner by yourself. Always seek assistance from another person. Lifting equipment that is too heavy may result in serious injury to personnel and/or damage to equipment.

WARNING

The PcCR 1417 scanner is a CLASS 1 Laser product.
- Do not remove the scanner cover!
- Cover removal should be done only by authorized service personnel!

Laser Safety Instructions

1. During normal operation, the scanner should always be enclosed in its protective cover. This is to prevent the outside area from being exposed to laser.
2. During normal operation, the cover should not be removed. Removing the cover should only be done for service purposes by a qualified technician.

1. PcCR 1417 System Introduction

1.1 Overview

The OREX PcCR 1417 System is used by medical personnel for reading phosphor x-ray plates (CR).

The system is composed of two main parts:

- The OREX PcCR 1417 scanner (see Figure 1-1).
- The PcCR 1417 software package, that includes:
    - The OREX Scanner Interface software that operates the scanner.
    - An image viewing and archiving software package that supports the DICOM 3.1 standard and was approved by OREX, such as HIPAX.

The following depicts the PcCR 1417 System operational principles, mechanical description, technical information, features, and instructions on how to handle and clean plates.

1.2 PcCR 1417 Operational Principles

The PcCR 1417 is a machine used for digital image acquisition and processing of static projection radiography. The PcCR 1417 uses a phosphor plate with energy storage capability as an x-ray image receptor.

After exposure, a laser beam, which stimulates luminescence proportional to the local x-ray exposure, reads the plate. The luminescence signal is digitized. The data is then subjected to digital image processing.

The OREX PcCR 1417 reader enables the user to read a plate quickly, and erase it to be ready for the next read. The reader is compact and easy to use.

The main advantage of the PcCR 1417 system is that it enables radiologists to “go digital” without changing their work practices or x-ray equipment.

1.3 Scanner Mechanical Description

The following depicts the scanner's main parts and functions (see Figure 1-1 and Figure 1-2):

No.	Item	Function
1.	Cassette Tray	Inserts the cassette into the reader for reading and erasing.
2.	10" Width Plate Adapter	Loads a centered 10" width plate.
3.	14" Width Plate Adapter	Loads a centered 14" width plate.
4.	**SYSTEM** LED **PROCESS** LED	Indicate the status of the scanner. (see Status Indicator chart in section 2)
5.	Power Connector	Connects the scanner to a power source. (120VA/100–240 VAC @ 50/60 Hz).
6.	ON/OFF Power Switch	Turns the scanner ON/OFF.
7.	USB Connector	Connects the reader to your computer, by using the USB communication protocol.

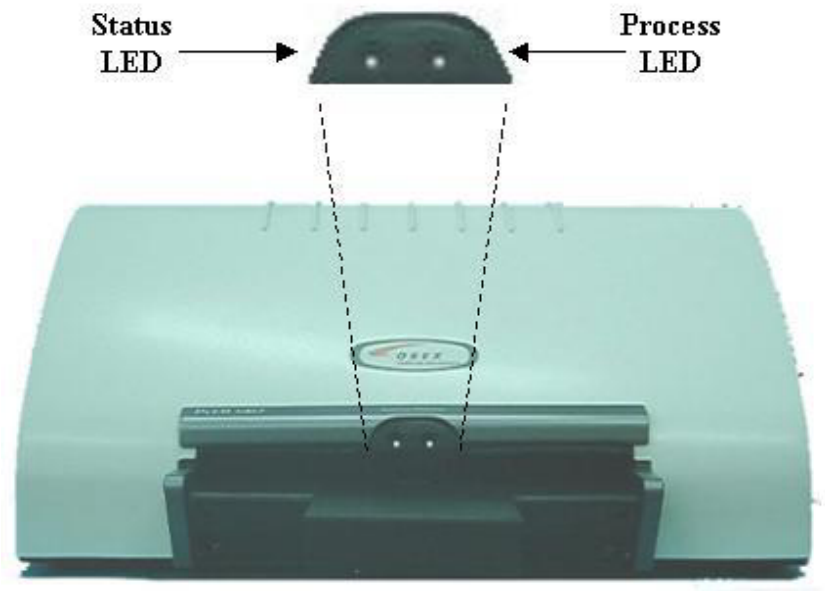


Figure 1-1: PcCR 1417 Front View

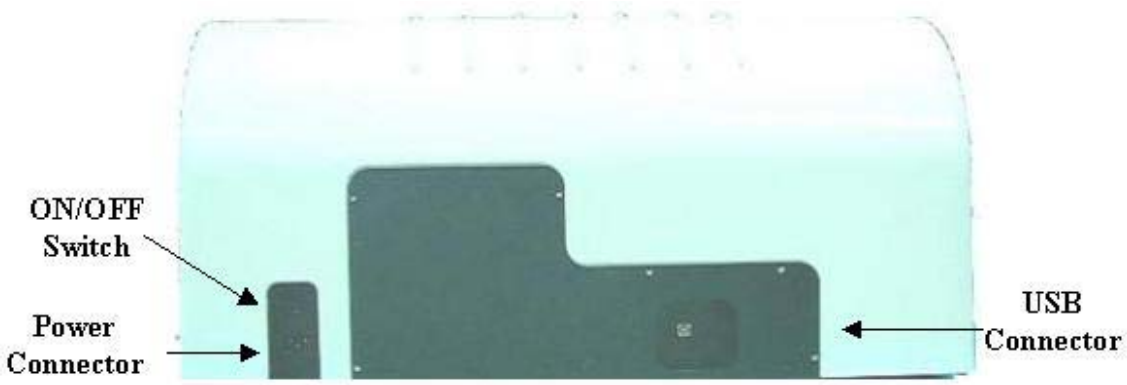


Figure 1-2: PcCR 1417 Back View

1.4 Features

- Large (14” x 17”) digital image reading and viewing archive.
- Plug and Play USB interface.
- The PcCR 1417 reader follows the provisions of the Medical Device Directive 93/42 EEC for class 1 Devices.
  The reader conforms with the following safety standards:
  - EN60950 (1992)
  - IEC60825-1 (1993-11)
  - IEC60601-1-2 (1993)

The CE mark that is used on OREX products is CE.

1.5 Technical Information and Specifications

Scanning Resolution	Standard format 14” x 17” Standard format 14” x 14” Normal format 10” x 12” Normal format 8” x 10” High resolution 8” x 10”	2.5 Lp/mm 2.5 Lp/mm 3.5 Lp/mm 3.5 Lp/mm 4.2 Lp/mm
Plate and Pixel Size	8" x 10" plate size	110 x 110 μm pixel size (or 100 x 100 μm at high resolution)
	10" x 12" plate size	126 x 126 μm pixel size
	14" x 14" plate size	173 x 173 μm pixel size
	14" x 17" plate size	173 x 173 μm pixel size
Plate Type	AGFA ADC-MD-30 (produced and licensed to OREX by AGFA-GEVAERT A.G.)	
Reading Time	8" x 10" plate size 10" x 12" plate size 14" x 14" plate size 14" x 17" plate size	130 sec. ±10% 120 sec. ±10% 113 sec. ±10% 113 sec. ±10%
Erasing Time	8" x 10" plate size 10" x 12" plate size 14" x 14" plate size 14" x 17" plate size	35 sec. ±10% 45 sec. ±10% 52 sec. ±10% 62 sec. ±10%
Read/Erase cycle time	8" x 10" plate size 10" x 12" plate size 14" x 14" plate size 14" x 17" plate size	165 sec. ±10% 165 sec. ±10% 165 sec. ±10% 175 sec. ±10%
File Size	10–13 MB (uncompressed) maximum, Up to 1 MB compressed	
Reader Dimensions	78 cm x 64 cm x 34 cm (30.7" x 25.2" x 13.4")	
Weight	40 Kg (88 lb)	
Power Consumption	120VA/100–240 VAC @ 50/60 Hz	
Environmental Operating Conditions	Temperature Relative Humidity Ambient Lighting	18–30 °C (normal lab conditions) 80% (max) non-condensing Less than 1000 Lux
Reading Laser Specifications	Visible Light Output Max Output Power	635 nm–650 nm 30 mW
Customer's Computer Min. Requirements	Type Operating System Internal Memory I/O Interface Required Disc Space Modem (for remote scanner servicing) UPS (APC or equivalent)	PIV, 1.8GHz or above Win 2000 256M RAM (minimum) USB 1.1 60M Bytes (for OREX software package only)

2. Using the PcCR 1417 System

2.1 Overview

This section provides a general flowchart and step-by-step instructions on how to scan a plate using the PcCR 1417 System, and instructions on how to change the photo multiplier (PM) gain value of a poor or over exposed image.

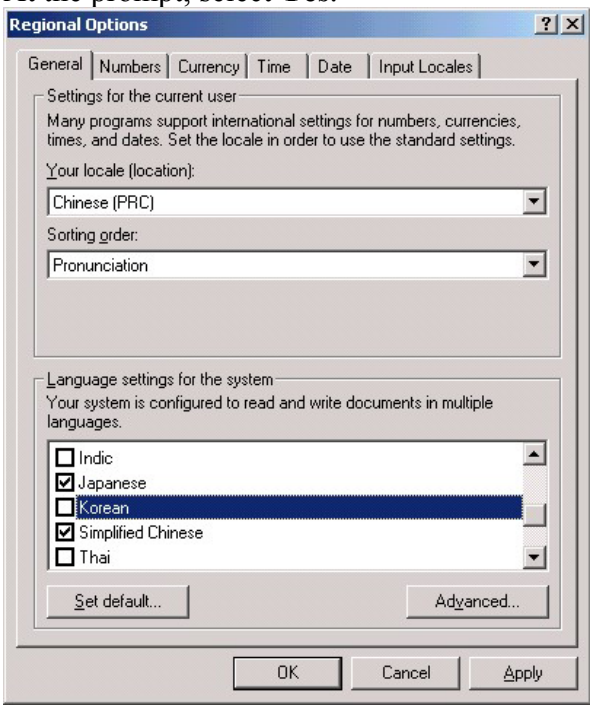
2.2 Language Support

The PcCR 1417 system supports interface in different languages.

NOTE:
To enable language support, ensure that your computer runs on a Windows 2000, system (English version).

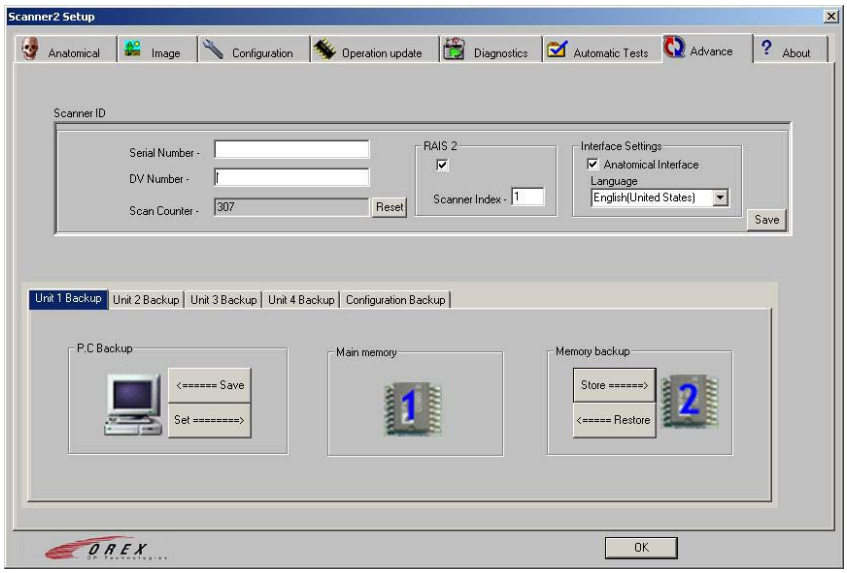
To change the interface language

1. From the Desktop go to Settings ➔ Control Panel; then double-click the Regional Settings icon.
2. From the **Change Locale** pull-down menu, choose the required language; for example, Chinese (PRC).
3. Click **Set as default**; then select the same language again; for example, Chinese (PRC).
4. At the prompt, select **Yes**.



5. Check that the chosen language support is installed on your computer.
6. Click **OK** to reboot the computer.

7. The computer restarts, running all applications, including the PcCR 1417, with the selected language.
8. If the language used is Chinese, enter the Scanner Interface – the Advanced tab.

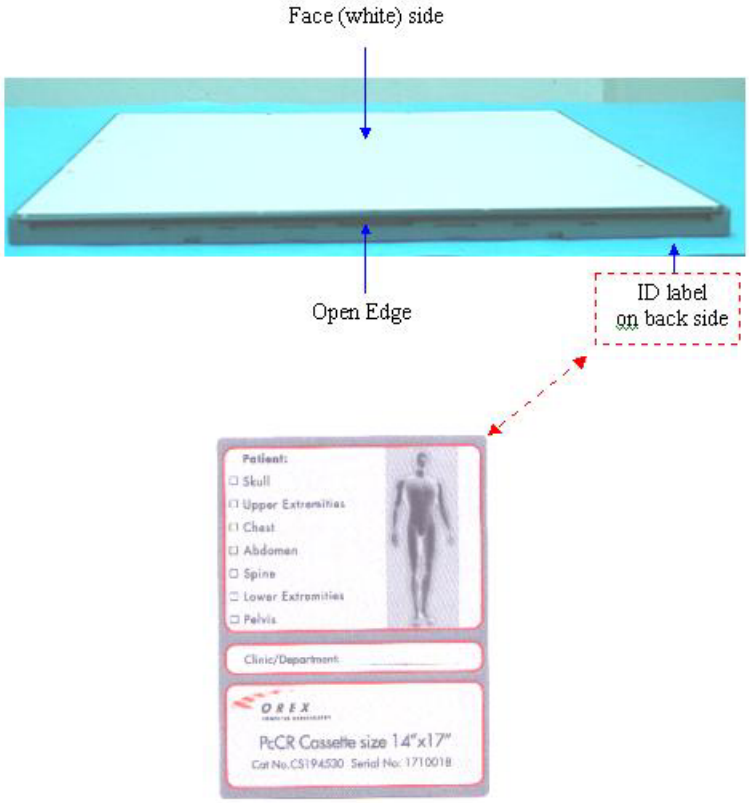


9. From the Language drop-down menu, select **Chinese RPS**.

2.3 Using the Image Plate with Cassette

An image plate comes in a cassette, and should remain there. The only time a plate is out of the cassette is when the scanner automatically loads the plate for reading.

It is important to keep the image plate positioned correctly throughout any procedure.

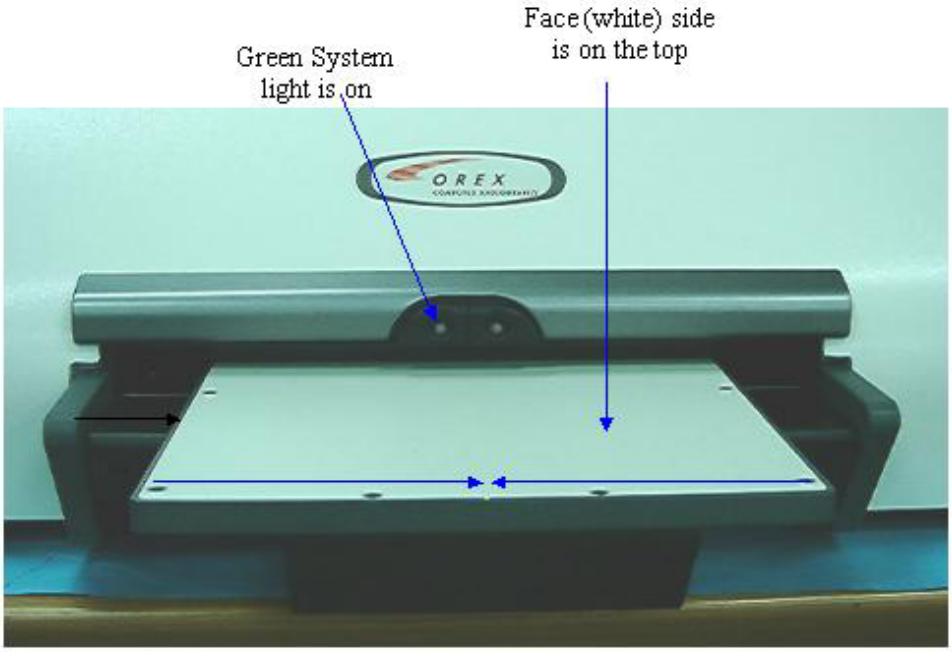


To load a cassette into the reader:

1. Verify that the scanner is **On**, and that the **System** LED is green, indicating that the scanner is ready.

2. Insert the cassette into the scanner:

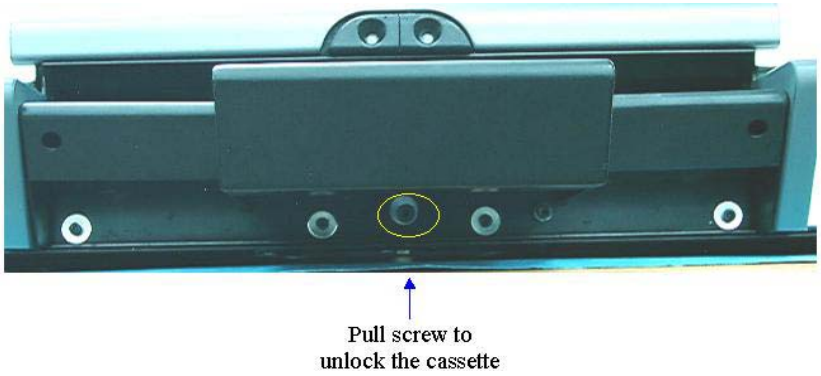
    - The face (white) side faces up,
    - The open edge points toward the scanner, and
    - The cassette is centered exactly from side to side in the scanner slot.



Cassette is centered

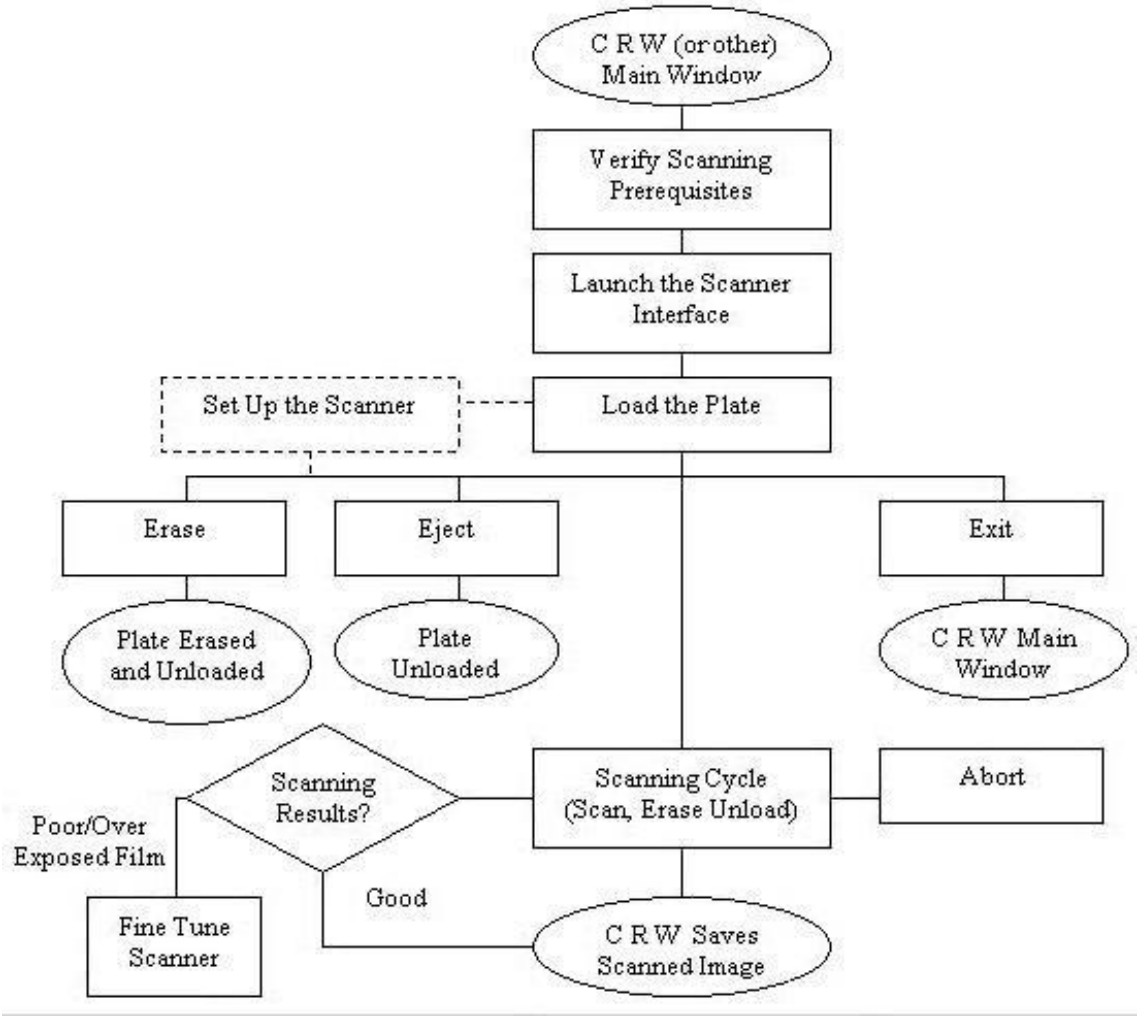
The cassette locks when it reaches its proper position in the scanner. Once the cassette locks, the image plate loads automatically.

Ordinarily, the cassette unlocks automatically after scanning, ready for re-use. In case you need to unlock the cassette manually, pull the screw beneath the slot to unlock the cassette.



2.4 Plate Scanning Process

The following flowchart depicts how to read a plate using the PcCR 1417 Reader.



The reading process is comprised of the following stages:

- Verifying the Prerequisites for Scanning
- Launching the Scanner Interface Software
- Loading a Cassette
- Setting Up the Reader
- Scanning and Erasing a Plate

2.4.1 Verifying the Prerequisites for Reading

Before the scanner reads the plate, check that the following conditions exist:

- The USB cable connects your computer to the reader (see Figure 2-1). When using the RAIS 2 option, it is possible to connect two readers to one computer.
- The reader is connected to the AC Power source (see Figure 2-1).
- The reader and scanning driver were configured and calibrated during installation by OREX authorized service personnel.

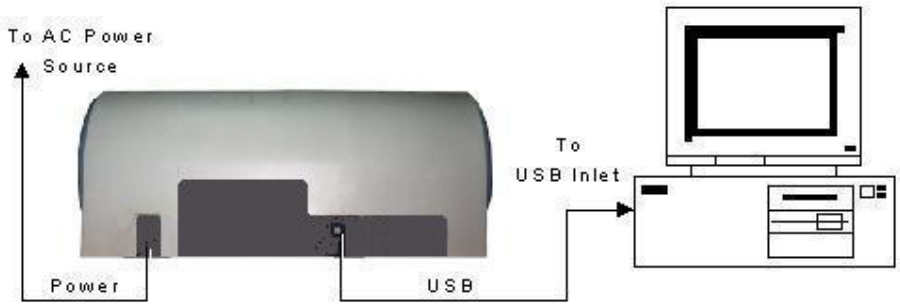


Figure 2-1: AC Power and USB Cable Connections

2.4.2 Launching the Scanner Interface Software

1. Switch ON the scanner Power Switch (see Figure 1-2).
2. If you are using Orex CRW, launch this program. For other programs, please get instructions from OREX authorized service personnel.
3. Insert a new patient file, or select an existing patient file.
4. Click the **Scan** icon to start the scanning process.
   - The OREX Scanner Interface main dialog opens.
   - The scanner starts communicating with the computer.
   - Within a few seconds, check that the scanner **SYSTEM** LED turns green (see Figure 1-1), and the **Insert plate** message is displayed on the main dialog.
5. Proceed with the following procedure, Loading a Cassette.

2.4.3 Loading a Cassette

Figure 2-2: Loading the Cassette

1. Place and center the cassette on the Cassette Tray (10" or 14" cassette width, shown in Figure 1-1).
2. Slightly push the cassette into the scanner (Figure 2-2) until it clicks into the locked position, and the **PROCESS** LED turns orange and starts blinking.
   - The plate is automatically "pulled" and loaded into the scanner.
   - The **PROCESS** indication LED changes from orange to green.
   - In the Scanner Interface's main dialog, the **Scan**, **Erase**, **Exit**, **Setup** and **Eject** functions turn valid.

     The reader is now in the correct condition to scan the loaded plate. The **Plate "inch" x "inch" is ready...** message is displayed on the main dialog.

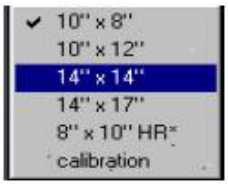
     At this point, you can choose to perform any of the following actions:

     - Unload the plate by clicking **Eject**.
     - Erase the loaded plate by clicking **Erase**.
     - Cancel and close the Scanner Interface by clicking **Exit**.
     - Scan the loaded plate. Proceed with the following procedure, Setting Up the Scanner.

     If no scanning is performed within 2 minutes, the cassette is ejected automatically.

2.4.4 Setting Up the Scanner

1. Click the **Setup** button in the scanner interface. The **Setup** dialog box opens. In the **Setup** dialog box, select the **Configuration** tab.
2. To set the size of the area to be scanned, left click the **Plate "inch" x "inch" is ready…** message. A drop-down-list appears. From the drop-down list, select the desired holder size. A 14" x 17" holder can be read partially by selecting a smaller holder size.



3. Select an **Organ** and a **Sub-Organ** by clicking the image of the body on the left side of the main dialog.
   a. Point your cursor at one of the body organs on the image. A popup menu opens.

   b. From the popup menu, select the sub-organ you want to scan.

4. Proceed with the following procedure, Scanning and Erasing a Plate.

2.4.5 Scanning and Erasing a Plate

IMPORTANT

While scanning, do not perform any other operation on your computer (for example, printing, network operation, or emailing). These operations may result in errors in the scanning process.

1. To begin scanning, click the **Scan** button.
   First the **Initializing scanning**, and then the **Scanning** messages are displayed on the main dialog.

   If you want to stop the reading process, click the **Abort** button The plate is automatically unloaded from the reader into the cassette without being erased.

   While scanning, you can see these things:

   - The scanner's **SYSTEM** LED (see Figure 1-1) turns orange, and the **PROCESS** LED is green.
   - You can view the scanned image in the Image Preview window.
   - A countdown timer is displayed, indicating the time left for reading the plate.

When the scanner has finished reading the plate, the digital image appears on the viewer.

- If Auto erase has been set in advance, an **Erase** message appears after scanning is completed. To view the Erase message, you must re-activate the Scanner Interface.
- If Auto erase hasn't been set in advance, insert the film, and wait for system initialization to be completed. When the **Plate "width" x "length" is ready...** message is displayed on the main dialog, press the **Erase** button. A countdown timer is displayed only in the non-automatic erasing mode.

2. Save the scanned image in the patient folder.

You have completed the plate scanning process.
At this point you can **re-use** the scanned and erased plate.

2.4.6 Reader Status Indicators

There are two status indicators located on the front of the PcCR-1417 scanner, above the cassette entry slot.

- The left LED indicates the status of the **system**
- The right LED indicates the status of the **process**

Each indicator can appear green, orange or red, and the color can be either constant or blinking. The colors indicate the following:

- Green: Ready, please activate the next step
- Orange: System is busy, please wait
- Red: Error, correct the malfunction before using the scanner

If an indicator is blinking, pay attention.

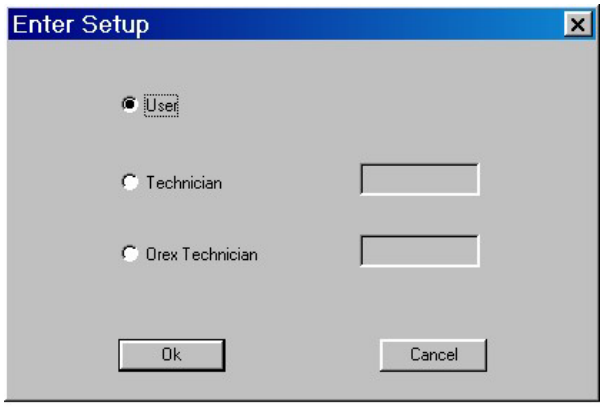
Reader Status		**System LED**	**Process LED**	**Possible User Action**
Off		No Light	No Light	Turn power on
Powering Up	Initialization	Orange	No Light	Please wait, reader is setting up
	Initialization	Green blinking	No Light	Cassette can be inserted
Power On		Green	Green	Cassette can be inserted
Loading	Plate insertion	Orange	Orange Blinking	Please wait, reader is loading the plate from the cassette
	Loading finished	Green	Green blinking	Activate next step. Possible actions: • Scan the plate • Erase the plate • Eject the plate • Exit scanner interface

Scanning (Reading the plate)		Orange	Orange	Please wait, reader is scanning the plate
Unloading	Erase plate	Orange blinking	Orange Blinking	Please wait, reader is erasing the plate
	Eject plate without erasing	Orange	Orange Blinking	Please wait, reader is ejecting the plate
Finish		Green	Green	Cassette can be inserted

2.5 Entering The Setup Menu

Setting up the system may only be performed by authorized personnel. Technicians of different levels are authorized to perform different activities. Therefore, when entering the Setup menu, you are prompted to enter you level (rank) and password.

1. From the main interface, click the **Setup** button.
   You are prompted to enter your user rank.



Note that the available options vary according to the rank of the user.

2. Choose **Orex Technician**.

3. Enter password.

4. Click **OK**.
   The **Setup** dialog box opens with the **Anatomical** screen selected.

2.6 Changing a PM Gain Value

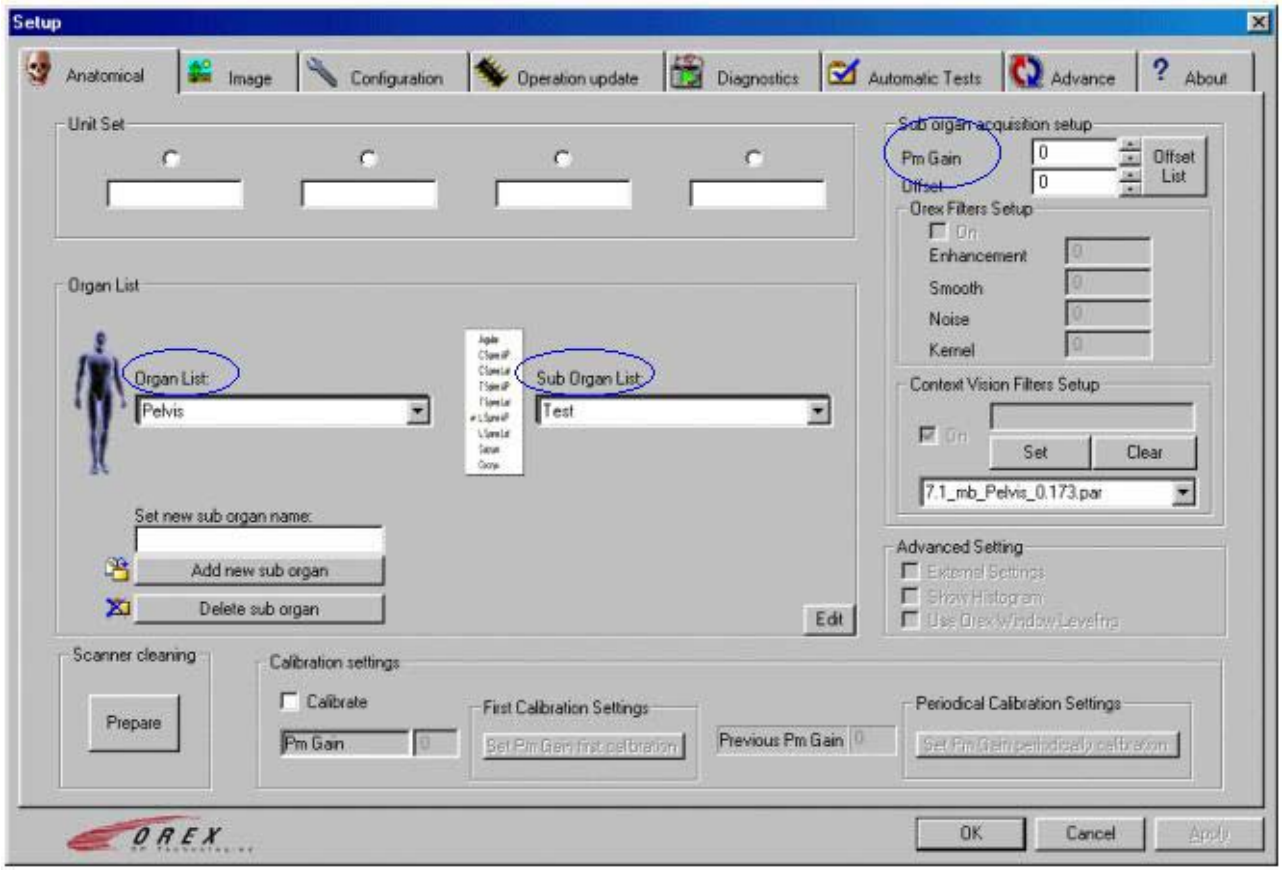
In some cases, it is possible to control the scanning results by changing the optical gain of the sub-organ image. Once changed, the new optical gain setting will affect the results of scanned images in the relevant unit only when that same sub-organ is selected.

IMPORTANT

The Offset parameter is set during installation and calibration of your PcCR 1417 System (refer to section 3). Do not change this value!

To change a PM gain value:

1. From the main interface, click the **Setup** button.
   The **Setup** dialog box opens with the **Anatomical** screen selected.



2. From the **Organ** drop-down list, select an organ (unless an organ has already been selected in the main dialog).

3. From the **Sub Organ** drop-down list, select the sub-organ image for which you would like to change the PM Gain (unless the sub-organ has already been selected in the main dialog).

4. Change/adjust the Sub-Organ PM Gain (in the Sub organ acquisition setup section):

    - To get a darker image (in case of poor exposure), increase the Sub Organ PM Gain by 10.
    - To get a lighter image (in case of over exposure), decrease the Sub Organ PM Gain by 10.

5. Click **OK** to return to the Scanner Interface's main dialog.

6. Record any PM gain changes you make (form provided in section 10).

You have completed changing a PM gain value.

2.7 Adjusting the System to an X-ray Unit

The Scanner Interface is designed to work with up to four x-ray machines. Each machine is represented by a number, and includes a unique set of PM Gain, offset, and filtration values for each sub-organ. Before x-raying, select the machine you are going to use by clicking that unit's number.

To adjust the system to an x-ray unit:

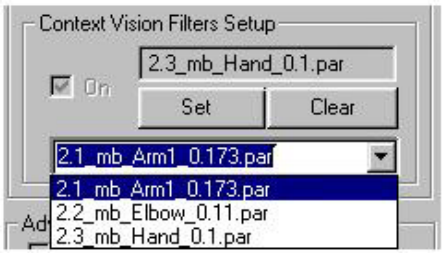
1. In the main dialog, click the desired unit (**1**, **2**, **3**, or **4**). This can also be done on the **Anatomical** tab of the **Setup** dialog.

2. Once inside a specific unit, you can use the Image Filtering and Window Leveling options.

   Filtering Notes:

   - If you check the **On** checkbox under **OREX Filters Setup** (technician password required), the Scanner Interface processes the image using the Enhancement, Smooth, Noise and Kernel values that appear on the screen (and that are specific to every sub-organ in each unit).
   - If you check the **On** checkbox under **Context Vision Filters Setup** (technician password required), the Scanner Interface processes the image using the Context Vision parameters. A specific filter has been optimized for each sub-organ in each unit, and this default filter appears in the Context Vision Filters Setup section whenever that sub-organ is selected.

     If the default filter does not turn out to be suitable for the sub-organ, you can select a different filter from the pull-down list (which is common to all the sub-organs creating an organ) and click the **Set** button. If you choose not to use a Context Vision filter for a specific sub-organ, click the **Clear** button.



   It is not possible to use the OREX filters and the Context Vision setup simultaneously.

- If you check the **Use OREX Window Leveling** checkbox (technician password required), the Scanner Interface searches for optimal window leveling values (for Width and Center parameters) to be used by the local viewer.
- Checking the **External Settings** checkbox (technician password required) allows an external program to select the organ, sub-organ and resolution.

3. Each unit can be given a name on the **Anatomical** tab. After you name a unit, that name appears on the main dialog whenever that unit is activated.

2.8 Adding and Deleting Sub-organs

If you want to add a new sub-organ, select the relevant organ, insert the new sub-organ, and click the **Add new sub-organ** button.

If you want to delete a sub-organ, select it and click the **Delete sub-organ** button.

Note:

When you add/delete sub-organs, changes are automatically saved in all units.

3. X-ray Machine-to-Scanner Calibration

3.1 Overview

This section provides step-by-step instructions on how to calibrate the reader to the local x-ray machine. Calibration is unit-specific (results are saved only in the unit that is active while calibrating).

The calibration procedure results in setting default values for offset and PM gain for all the organs and sub-organs specific to the scanner and x-ray machine.

Objective:	The objective is to create a look-up table (LUT) containing offset and PM gain values for all organs.	
Frequency:	Set calibration initially Calibrate periodically	
Responsibility:	Initial calibration:	technician/distributor
	Periodic calibration:	scanner owner/operator

Required Tools and Equipment:

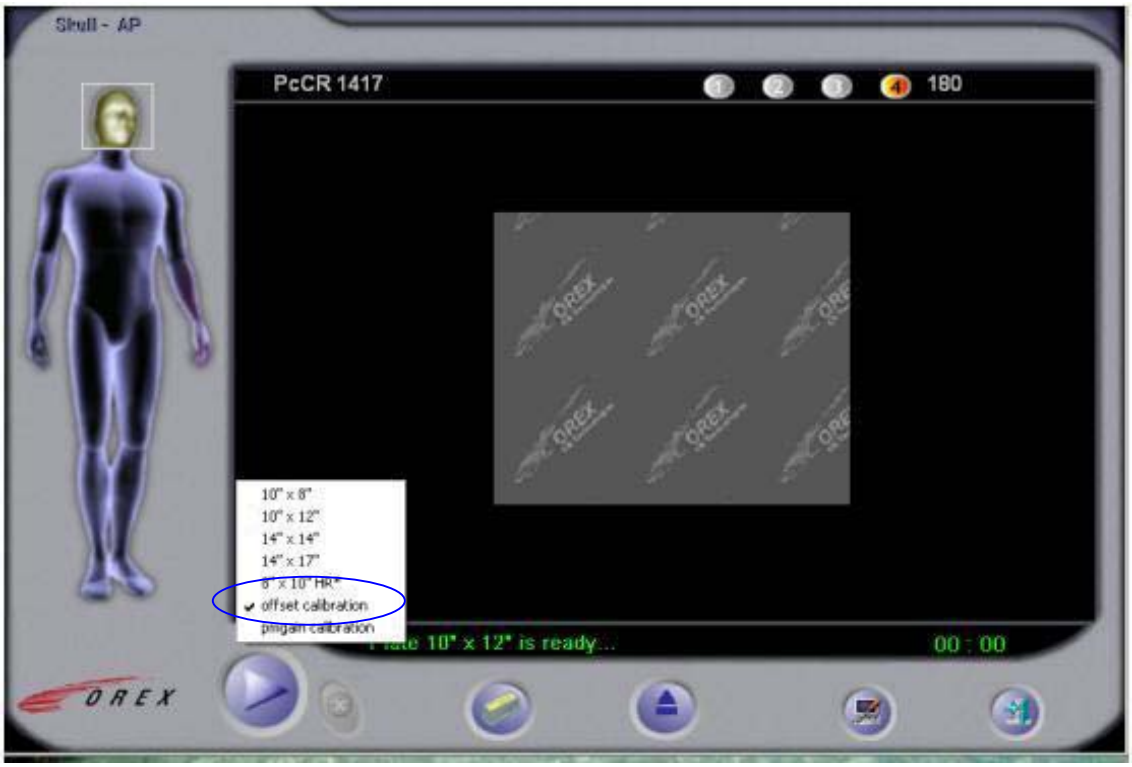
- 14” x 17” blank phosphor plate
- Dosimeter

3.2 Calibration Procedure

3.2.1 Offset Calibration

1. Put the 14” x 17” cassette containing the phosphor plate into the scanner.
2. Verify that the system is closed (to eliminate light penetration).
3. Erase the phosphor plate twice (to eliminate any remainder of information on the film).
4. In the main interface, click the **Setup** button. The **Setup** dialog opens.
5. From the **Setup** dialog, select the **Image** tab. In the **Data correction method** field, select **No Correction**. Then **Save**.

6. On the main screen of the scanner interface, click the **Plate size** field. From the pop-up menu that opens, select the **Offset calibration** function.



7. Click the **Start scan** button.
   For every PM gain, the system calculates an equivalent offset value.

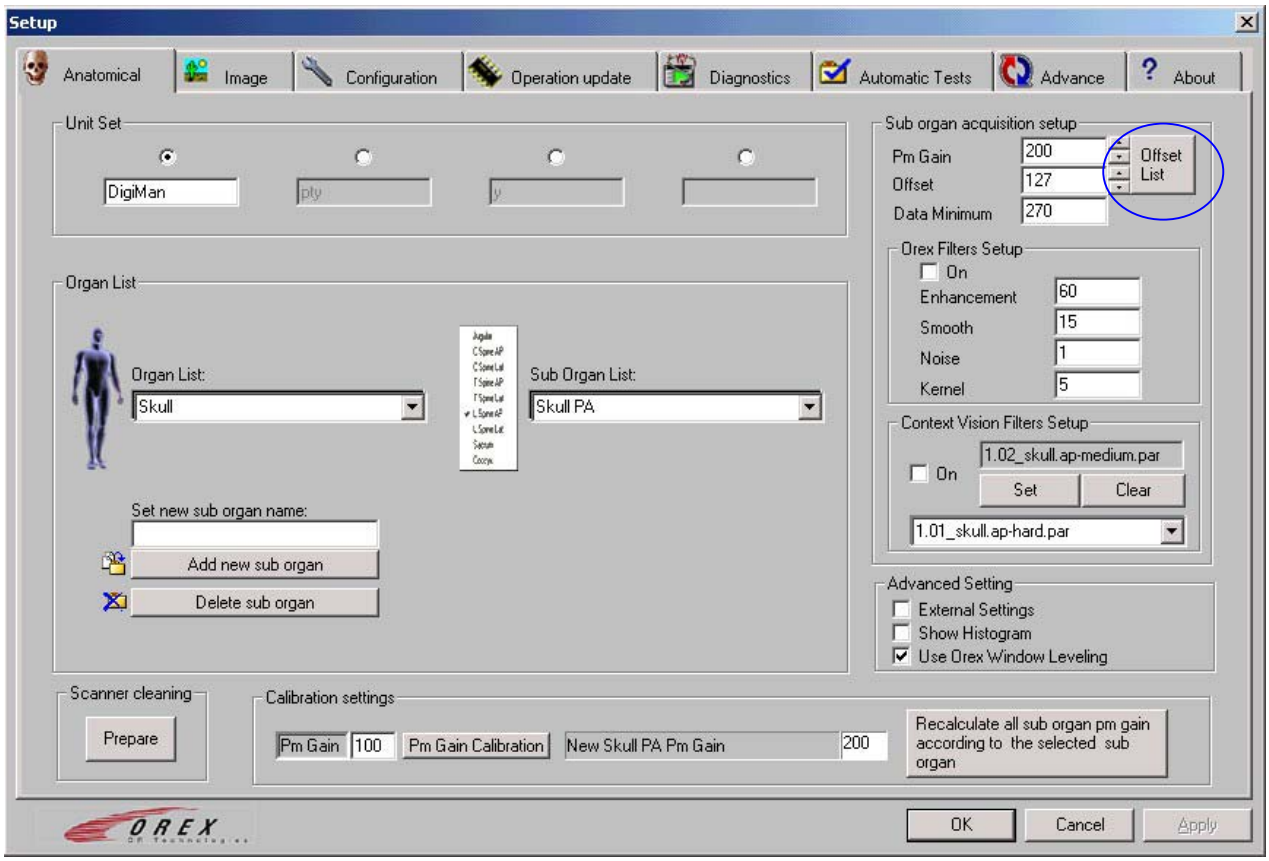
The system finishes the first part of calibration by displaying either the **Successful** or **Failure** message box.

Note:

We estimate that an empty plate=no radiation=minimum information.

The first step of calibration creates the offset and PM gain LUT.

To verify this table, press the **Offset List** button on the **Anatomical** tab of the scanner interface's **Setup** dialog.



Note:

Do not forget to re-check the Linearization option on the **Image** tab of the **Setup** dialog.

3.2.2 PM Gain Calibration

The second part of calibration finds the PM gains with radiation dose allowed on the phosphor plate from the local x-ray machine, depending on the density of the scanned organ.

1. Put the 14" x 7" cassette containing the phosphor plate into the scanner.

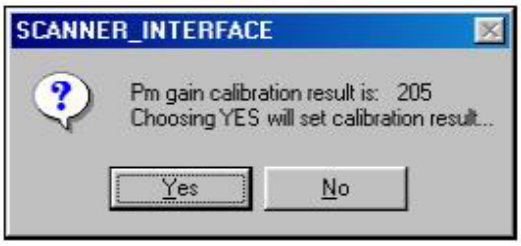
2. Verify that the system is closed (to eliminate light penetration).

3. Erase the phosphor plate twice (to eliminate any remainder of information on the film).

4. Expose the plate to x-ray. Use the maximum dose allowed depending on the local x-ray machine and the 'film speed' used. We estimate the parameters when using 400 ASA to be approximately 190 PM gain, and when using 200 ASA, to be approximately 150 PM gain.

5. On the main screen of the scanner interface, click the **Plate size** field. From the pop-up menu that opens, select the **PM gain calibration** function.

6. Click the **Start scan** button.
The system calculates the PM gain.
When the scanning finishes, this dialog box opens:

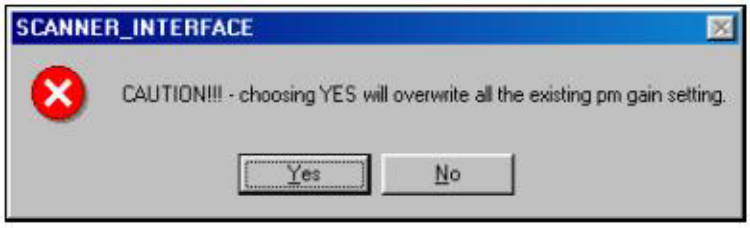


7. Click **Yes** to save the news PM gain calibration value.

8. Open the Scanner Interface.

9. Select the **Anatomical** tab, press **Edit** and insert the technician password.

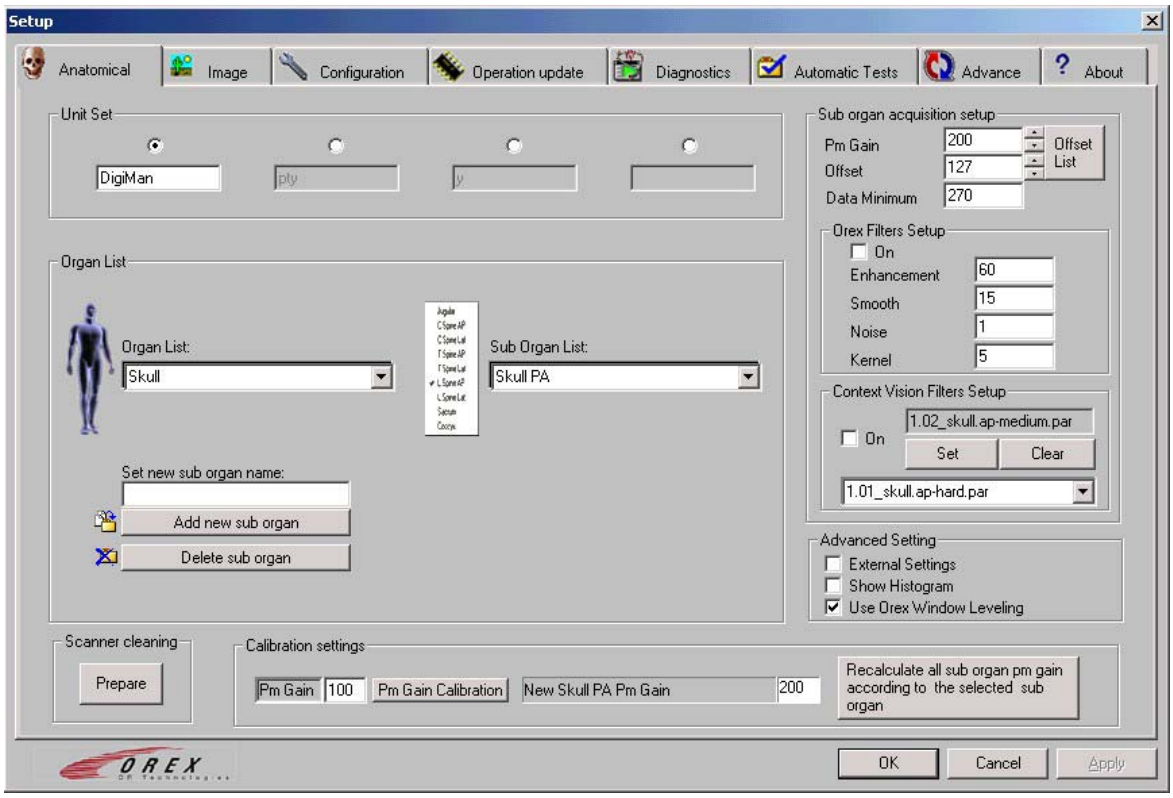
10. Click the **Set PM gain first calibration** button.
The following dialog box opens:



11. Click **Yes** to set the new calibrated value as the default.

If you are dissatisfied with the results, you can Fix the PM Gain for the specific organ you are calibrating, you can

12. Enter the new value required, in the **New [organ] PM Gain.**



13. Click the **Recalculate all sub-organ pm gain according to the selected sub-organ** button.
    After you accept the warning message, the PM gain in all sub-organs allocated to the selected organ, are recalculated according to the new value.

14. Close the **Setup** screen.
    The Scanner Interface's main dialog re-opens.

15. **Exit** the Scanner Interface.
    The viewer program's main window re-opens.

You have completed calibrating the scanner PM gain and Offset.

4. Image Property

4.1 Overview

The Image Property section on the Image tab allows you to choose:

- an image format.
- a path to the image's location on your hard disk, from which the viewer reads the raw image file.

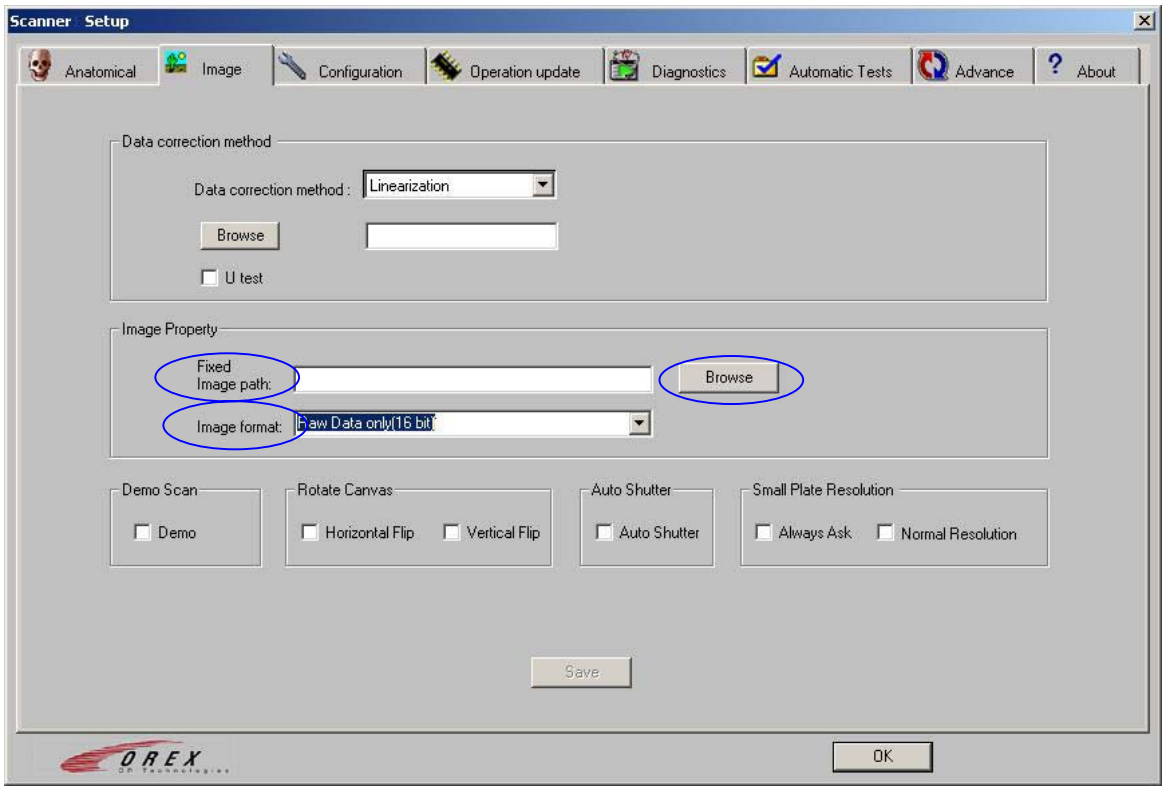
4.2 Selecting an Image Path

If an image fails to appear on your viewer, it is important to make sure that the image's "Fixed image path" in your viewer matches the location on your hard disk (contact OREX support for the location on the hard disk).

1. In the main dialog, click the **Setup** button. The **Setup** dialog opens. In the **Setup** dialog, select the **Image** tab.

2. From the **Image format** drop-down list, select an image format (bmp, raw data).

3. From the **Fixed Image** path drop-down list, click the **Browse** button, and browse to the correct location. The Fixed Image path is automatically updated.

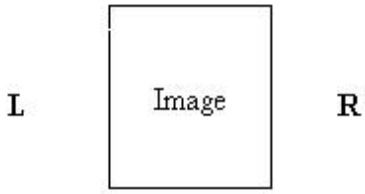


5. Resolution, Orientation and Linearization

5.1 Overview

The 8” x 10” holder can be scanned in either normal or high resolution. Reading a plate in high resolution is recommended whenever you wish to focus on small structures (physiological or pathological).

The Scanner Interface creates a mirror image from input, so that left and right appear as they do on regular x-ray film:



Linearization is a mathematical algorithm that corrects distortions in the plate’s absorption. Using this algorithm promotes a more reliable image.

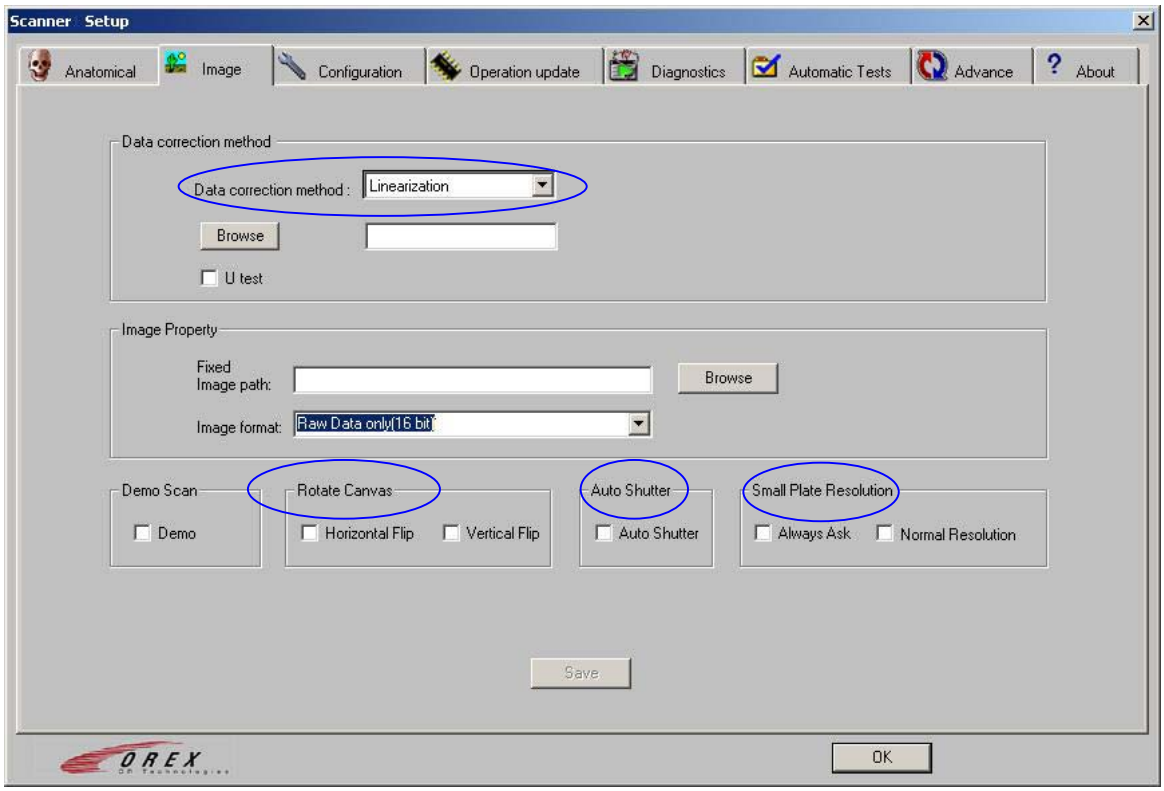
5.2 Setting Resolution, Orientation and Linearization

1. In the main dialog, click the **Setup** button. The **Setup** dialog opens. In the **Setup** dialog, select the **Image** tab.

2. On the Image tab, in the small plate resolution section, if you check the **Always Ask** check box, the following dialog box will open each time an 8” x 10” holder is loaded into the scanner:

   In the 8” x 10” Plate dialog box, check the resolution of your choice, and click **OK**.

3. If you do not want this dialog box to appear prior to every small plate scanning procedure, make sure the **Always Ask** check box is not checked on the **Image** tab.



4. To select permanent normal resolution, do not check the **Normal Resolution** check box. Leave the **Normal Resolution** check box empty.

5. To select permanent high resolution, check the **Normal Resolution** check box, and the Normal Resolution text immediately changes to High Resolution. The end result is the **High Resolution** check box is checked.

   A **Film "8" x "10" HR is ready...** message is displayed on the main dialog whenever high resolution is selected.

6. If you wish that the system automatically erase any white outline around the image, select the **Auto Shutter** checkbox.

7. If you wish to change image orientation, check one of the **Rotate Canvas** check boxes: **Horizontal Flip** or **Vertical Flip**.

8. If you want to use the linearization algorithm, select **Linearization** from the **Data correction method** drop-down list. If you do not wish to use this algorithm, select **No Correction**.

Note:

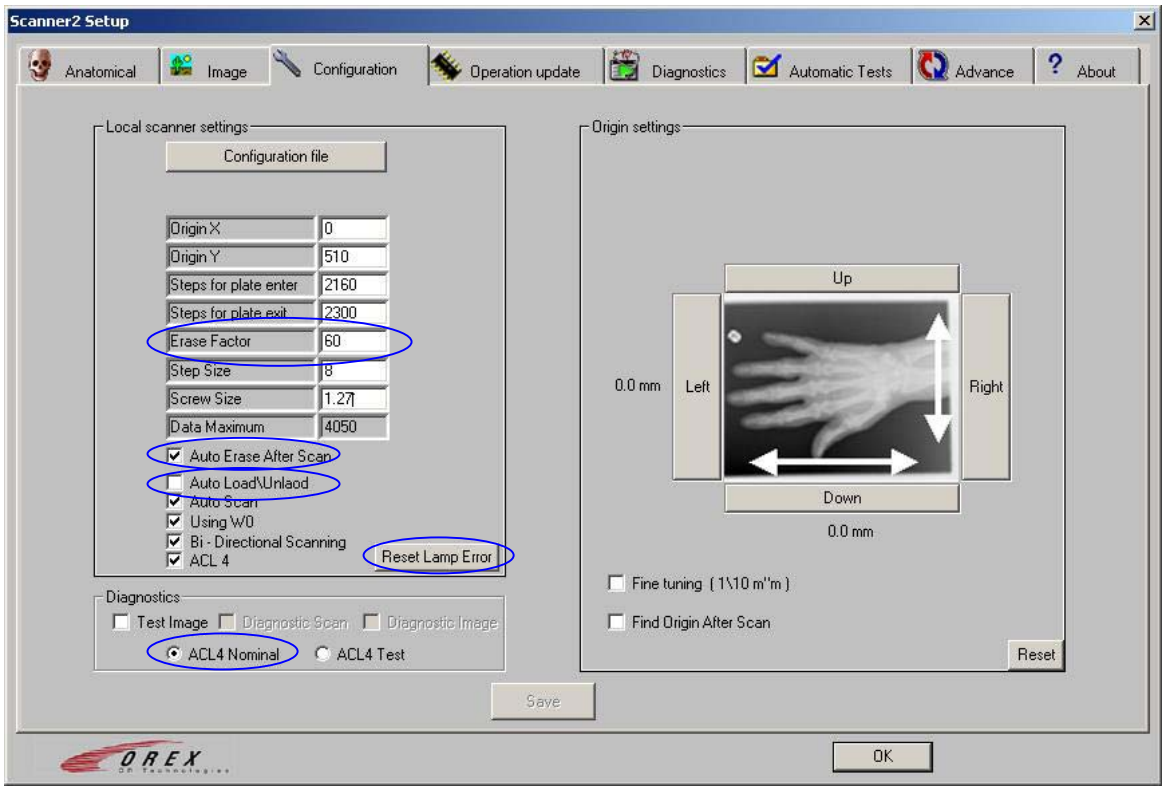
You must save all the changes you make on the Image tab if you want them to be saved, except for changes in the Image Property section.

6. Erasing Options and Automatic Scan

6.1 Overview

The scanner Configuration library consists of several options that are used daily:

- Note that **ACL 4 Nominal** at the bottom of the screen is selected.
- **Auto erase after scan** enables the erasing of a plate automatically after the scan is completed.
- **Erase factor** enables you to choose the number of erasing steps, which is proportional to erasing time. The available range is 8-127.
- **Automatic scan** enables the initiation of a scanning procedure as soon as the cassette enters the scanner.



Note:

Remember to click **Reset Lamp Error** after you repair an erase lamp problem. Failure to do so will result in illogical Lamp error messages.

6.2 Setting Erasing Options and Auto Scan

1. In the main dialog, click the **Setup** button. The **Setup** dialog opens. In the **Setup** dialog, select the **Configuration** tab.

2. Check the **Auto erase after scan** checkbox, then click **Save**.

3. Perform a scan. After scanning is completed, erasing occurs automatically.

4. Check the **Auto Scan** checkbox, then click **Save**. Scanning will occur automatically as soon as film enters the scanner.

5. For optimal erasing, enter the following **Erase factors**, and **Save**:

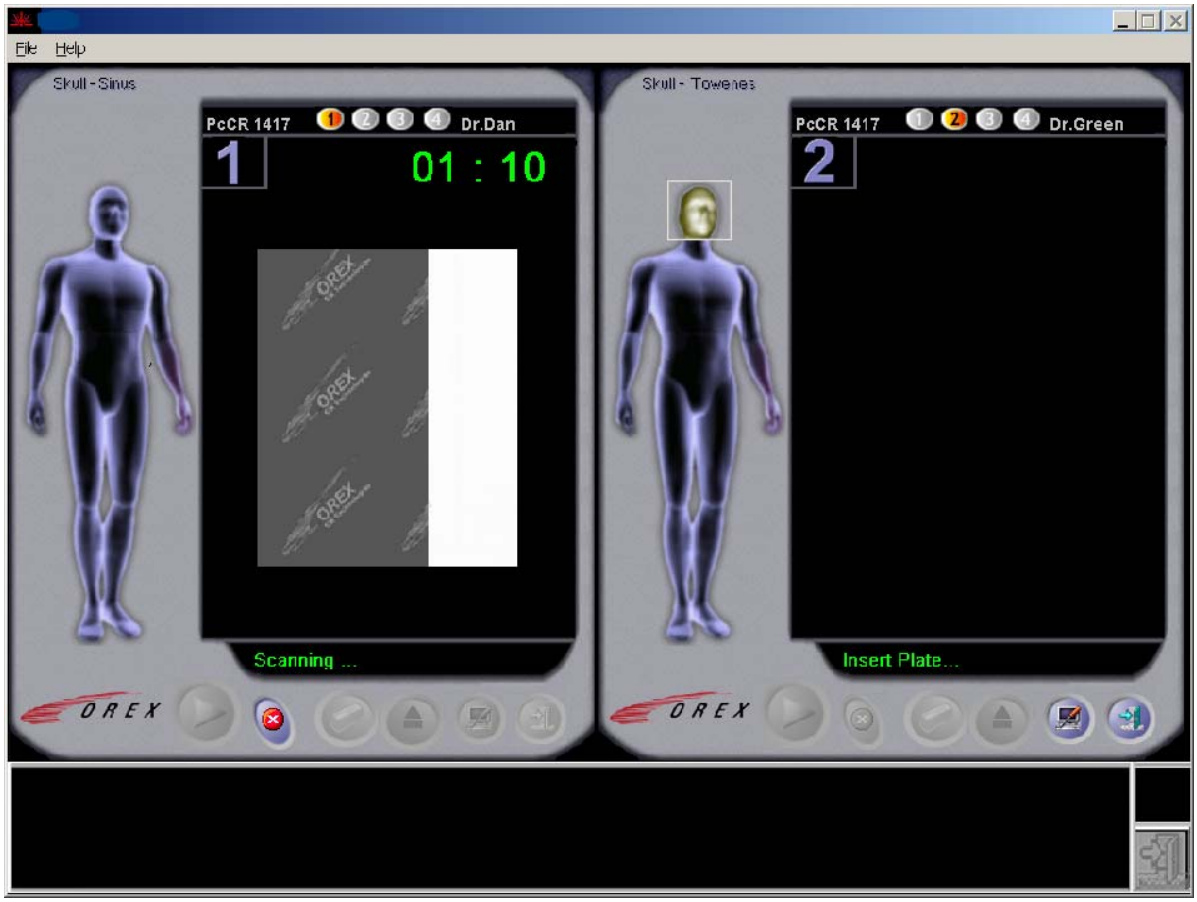
    - Agfa/Fuji 8 x 10 film: **38**
    - Agfa/Fuji 14 x 17 film: **38**

7. RAIS 2

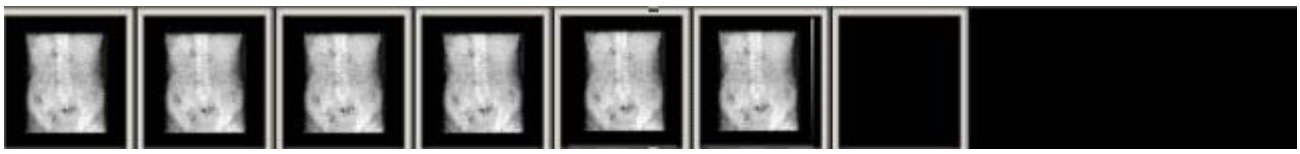
When performing an x-raying session, x-ray images are taken sequentially, one at a time, by altering the position of the patient. These images, displaying an organ from different angles, are grouped together to create a patient study. With the OREX concept, each x-ray exposure is immediately fed into the locally positioned CR (Computed Radiography) system. As the CR scanner can only scan images one by one, the duration of creating a study is limited by the throughput of this local CR system.

In the **RAIS 2** system, the task of creating a study from the x-ray exposures is shared by two independent CR scanners, thus raising the performance power by up to two. In addition to the reduction of the study-creating duration, the **RAIS 2** system offers flexibility and reliability (redundancy), inherent to the fact the each CR scanner operates as a complete system with the capability of solely performing the scanning task. If one of the scanners fails, this does not affect the operation of the other one. The scanning and filtering functions are synchronized between the units; it is not possible to scan on one unit, while filtering on the other.

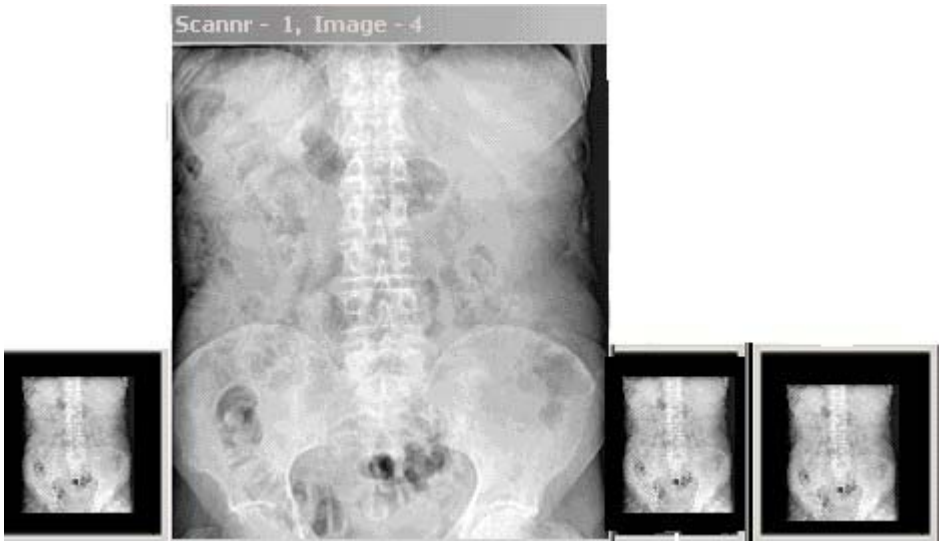
A special GUI enables viewing the control panels of both devices connected to one computer. Each control panel enables direct communication with the specific independent device for set-up, control and diagnostics.



The bottom part of the screen displays the current study with the latest ten acquired images (as thumbnails).



When less than ten images have been acquired, the remaining section remains black.



It is possible to right-click any of the images for an enlarged preview.

After acquiring the required images, you can exit the scanning interface, by clicking .
The system enters the viewer, and displays the entire study.

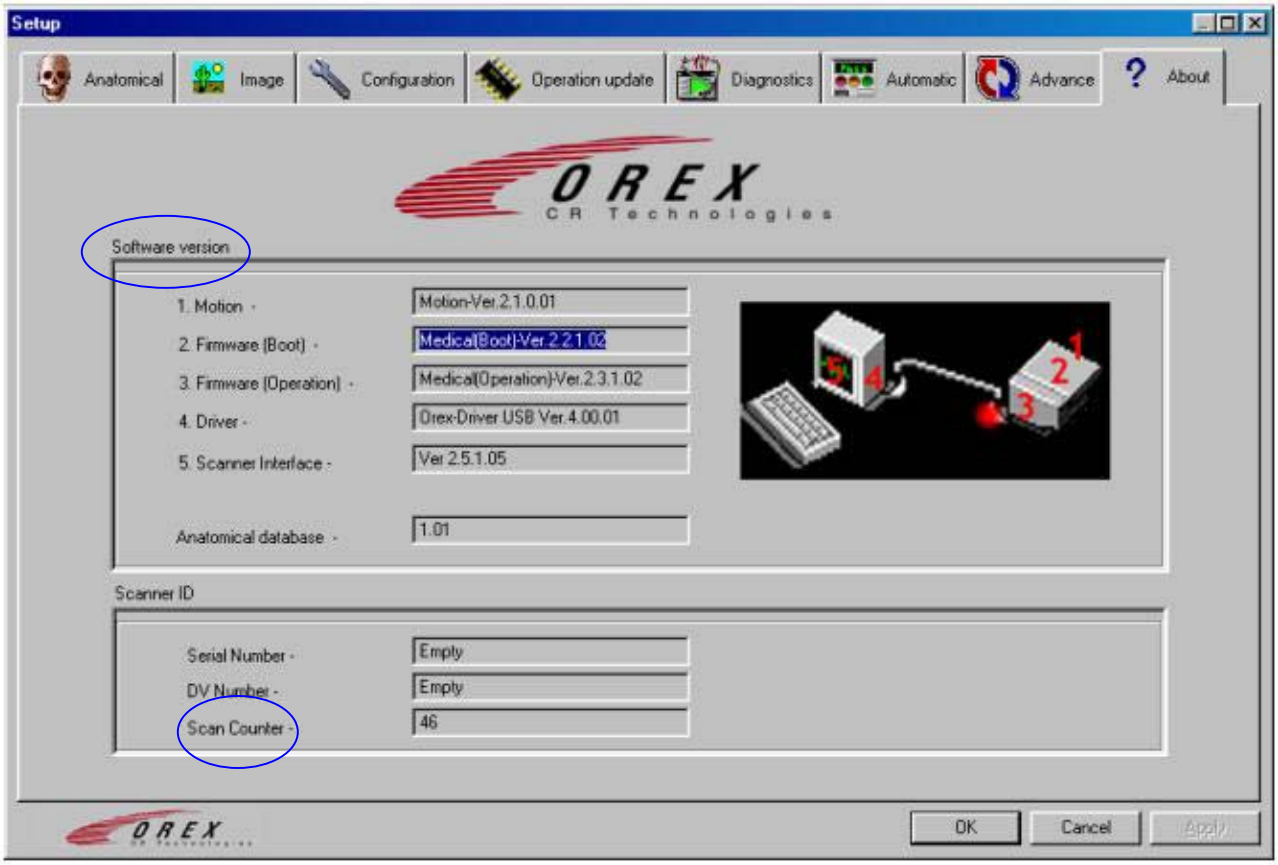
Dent - A - View II - Abdomen_ENH.DCM
File Image Filter View Tools Window Help
1:1
knee_ENH.DCM
Abdomen_ENH.DCM
Arm_ENH.DCM
23735
2000
Preset
Auto
Bones
Soft Tissues
Stretch Levels
12% Width: 2000 Height: 2400 Gray 16 Bits

8. About OREX Software

The **About** OREX Software tab lists the versions of system's software (Boot, Scanner Interface, and so on). Knowing which versions you have may be necessary when you contact a technician or support personnel by phone or email.

You can also view the number of 'reads' that have been performed by your reader since the last reset on the **About** tab.

A Serial Number and a DV number, which can also be viewed on this tab, define each scanner.



9. Troubleshooting

9.1 Overview

This section provides general guidelines for correcting malfunctions that may occur when using the PcCR 1417 System, and answers to Frequently Asked Questions (FAQs).

9.2 Error List

IMPORTANT

Inform OREX directly or through your vendor about any error messages that may appear. Do not attempt to repair the malfunction by yourself!

Error Message	Cause/Description
Update software please	Memory of Operation Firmware is empty.
Wrong loader parameters	Number of steps for loader's film entering/exiting is not correct.
Lamp 1 turn on fail	First erase lamp cannot turn on—erasing procedure will be performed at half speed.
Lamp 2 turn on fail	Second erase lamp cannot turn on—erasing procedure will be performed at half speed.
Both erase lamps are not working. Erase cannot be performed.	Erasing procedure cannot be performed. If detected in the middle of a scan, the scan will be completed, but the cassette will be ejected without being erased.
Carrier return fail	Stepper motor malfunction.
W0 sensor ON state fail	W0 sensor continuously recognizes film passing through it.
Roller sensor ON state fail	Scanner continuously recognizes film inside rollers.
W0 sensor OFF state fail	W0 sensor cannot recognize film passing through it.
Roller sensor OFF state fail	Scanner cannot recognize film inside rollers.
Z0 sensor ON state fail	Z0 sensor continuously recognizes film passing through it.
Cassette insert fail *	Cassette lock mechanism has failed.
Plate unload fail *	Cassette release mechanism has failed.

* In case of Cassette insert/Plate unload fail message, pull the handle under the cassette tray.

9.3 Frequently Asked Questions

Question:	
Answer:	
Question:	
Answer:	
Question:	
Answer:	
Question:	
Answer:	

10. Recording Sub-Organ Offset and PM Gain Values

This section provides a place for you to record the PM gain values you set for various organs/sub-organs. Whenever you change a value, please record the new value in the table below (for changing a PM gain value, refer to section 2.3). This record is useful whenever you want to restore any PM gain changes you made to each organ/sub-organ image.

Organ	Sub-Organ	Gain Value
Skull	Skull AP	
	Skull PA	
	Skull Lateral	
	Skull Towne's	
	Maxilla	
	Sinus	
	Mandible	
Upper Extremities	Shoulder AP	
	Shoulder Lateral	
	Humorus	
	Elbow	
	Forearm	
	Wrist	
	Hand	
	Fingers	
Chest	Chest AP	
	Chest PA	
	Chest Lateral	
	Ribs	
	Sternum	
	Clavicles	
	Scapula	

Organ	Sub-Organ	Gain Value
Abdomen	Abdomen AP	
	Abdomen Right Decubitus	
	Abdomen Left Decubitus	
	Bladder	
	Diaphragm	
	Renal	
Spine	Jugular	
	Cervical Spine AP	
	Cervical Spine Lateral	
	Thoracic Spine AP	
	Thoracic Spine Lateral	
	Lumbar Spine AP	
	Lumbar Spine Lateral	
	Sacrum	
	Coccyx	
Lower Extremities	Hip	
	Femur	
	Knee	
	Fibula	
	Tibia	
	Ankle	
	Foot	
Pelvis	Pelvis AP	
	Pelvis oblique	
	Iliac	
	Pubis	

11. Cleaning the Rollers

11.1 Overview

The rollers should be cleaned periodically to remove dust and small particles. The roller-cleaning device enables you to clean the rollers that feed the image plate from the cassette into the reader.

The Cleaning device includes the following items:

- Cleaning tray
- Cleaning plate with adhesive strips covered with protective paper/a protective envelope.

11.2 Using the Cleaning Plate to Clean the Rollers

1. Remove the cassette and plates form the reader.
2. Open the Scanner Interface.
3. On the Scanner Interface, click the **Setup** button. The **Setup** dialog box opens.
4. In the **Setup** dialog box, select the **Anatomical** tab.
5. Click the **Prepare** button in the **Scanner cleaning** box located in the lower left corner of the **Anatomical** tab.
6. Disconnect the reader from the electric power source.
7. Attach the cleaning tray to the reader. Push it in until you hear a ‘click’ sound.

8. Remove the transparent protective sheet/protective envelope from the cleaning plate.

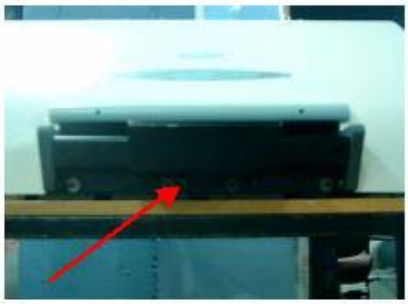
9. Remove the protective paper strips from the cleaning plate to expose the adhesive.

10. Place the cleaning plate on the tray. Make sure the cleaning plate is placed in the correct direction, as specified on the plate.

11. While holding onto the plate, push the plate into the reader. It should go in almost entirely. A 10 cm segment of the plate should remain visible. Then pull the plate out.

12. Repeat step 11 four to six times.

13. Remove the cleaning plate from the reader. Disconnect the cleaning tray by pulling out the knob underneath the front tray.

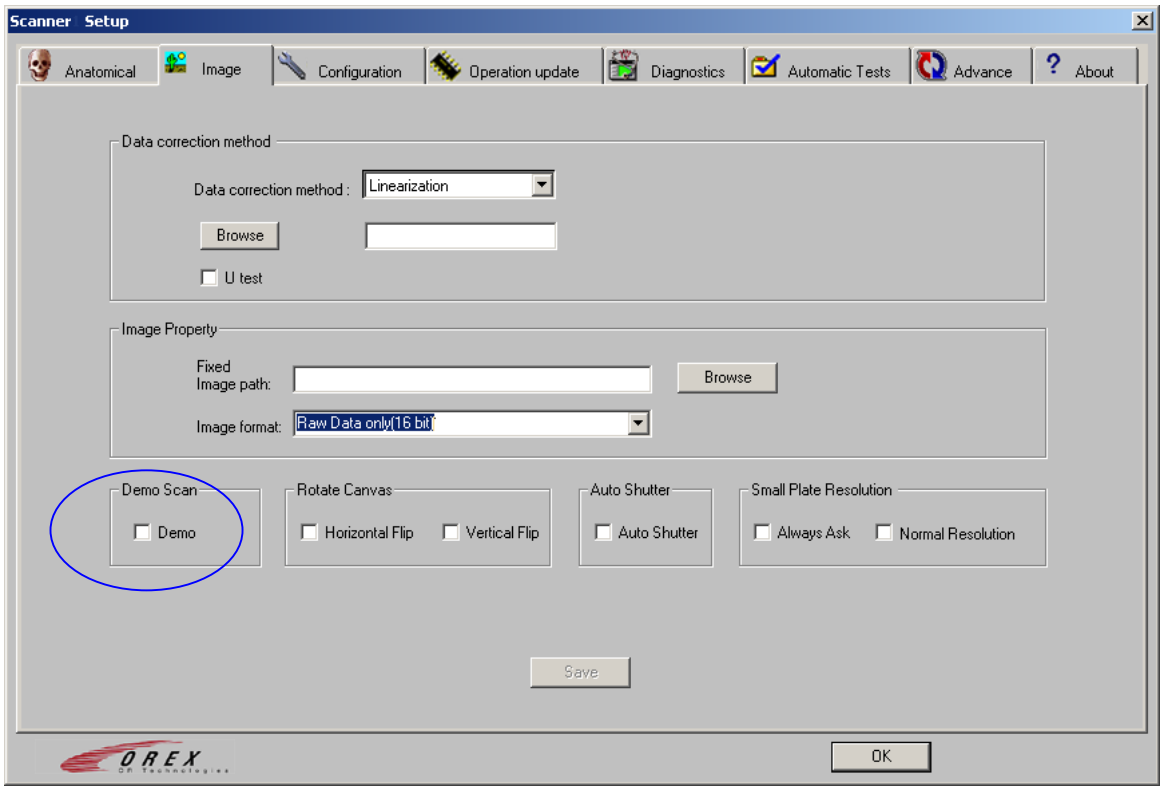


12. Demo Scan

The Demo Scan function enables you to display an image on your computer screen without connecting to the scanner.

To use the Demo scan function:

1. On the main interface, click the **Setup** button. The **Setup** dialog opens.
2. In the **Setup** dialog, select the **Image** tab.



3. On the **Image** tab, in the **Demo Scan** section in the lower left corner, check the **Demo** checkbox.
4. Click **Save**.
   An image from OREX's database appears on the main interface.

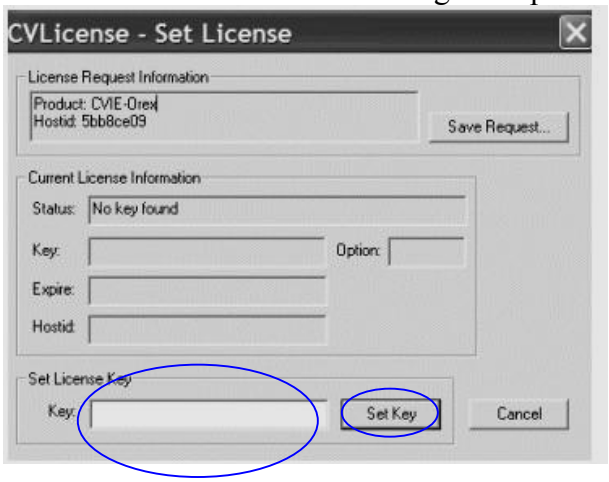
When demo-scanning ends, a **Saving Image** message appears on the main interface. If OREX filters or Context Vision Setup were selected prior to demo-scanning, image filtering will take place.

The demo- scanned images are saved in the study that is currently active on the viewer.

13. Installing Context Vision

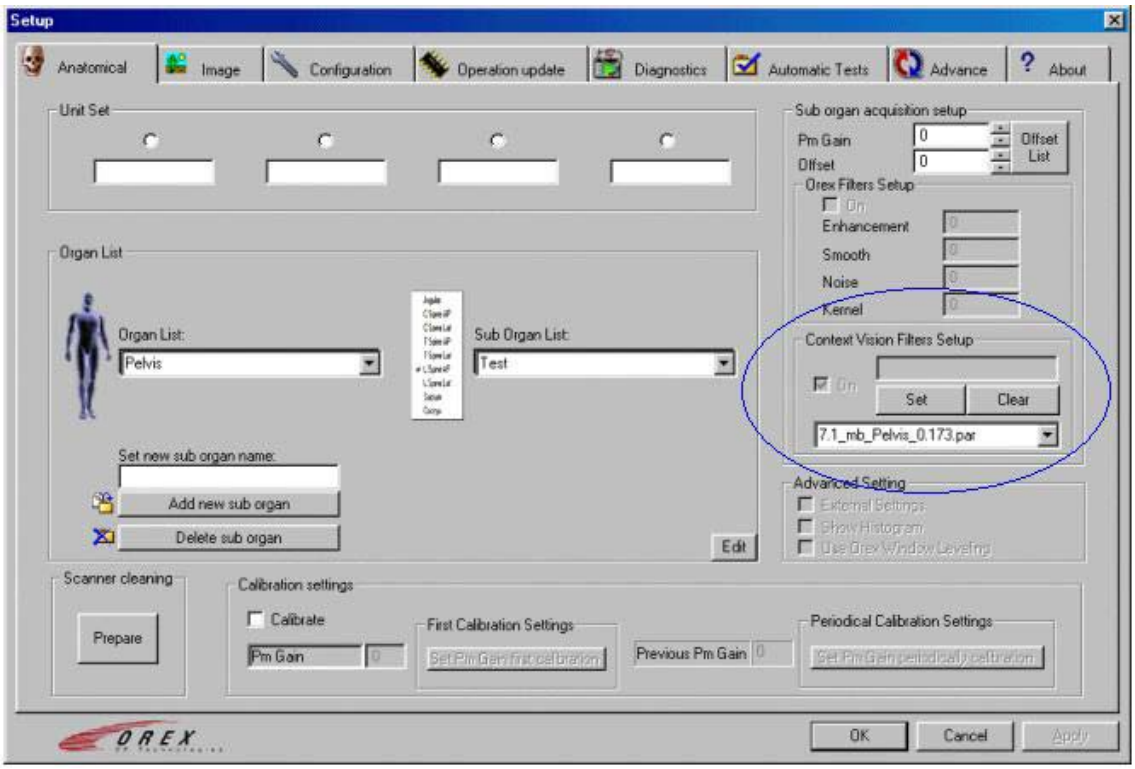
1. Run the **CVLicense.exe** program, located on the installation CD.
2. Double-click **CVIE-Orex-Soft**.

The CVLicense–Set License dialog box opens.



3. In the **Key** field, enter the license key, which is located on the dongle; then press **Set Key**.
4. Press **OK**.

The Context Vision filters are now enabled. The filter functions can be set up in the **Setup** dialog on the **Configuration** and the **Anatomical** tabs.


Setup
Anatomical
Image
Configuration
Operation update
Diagnostics
Automatic Tests
Advance
About
Unit Set
Sub organ acquisition setup
Pm Gain
Offset
Offset List
Orex Filters Setup
On
Enhancement
Smooth
Noise
Kernel
Organ List
Organ List:
Pelvis
Sub Organ List:
Test
Context Vision Filters Setup
On
Set
Clear
7.1_mb_Pelvis_0.173.par
Set new sub organ name:
Add new sub organ
Delete sub organ
Edit
Advanced Setting
External Settings
Show Histogram
Use Orex Window Leveling
Scanner cleaning
Prepare
Calibration settings
Calibrate
Pm Gain
First Calibration Settings
Set Pm Gain first calibration
Previous Pm Gain
Periodical Calibration Settings
Set Pm Gain periodical calibration
OREX
OK
Cancel
Apply